



BAV99QB-Q

Dual series high-speed switching diodes

13 February 2024

Product data sheet

1. General description

Dual series high-speed switching diodes, encapsulated in an ultra small DFN1110D-3 (SOT8015, JEDEC MO340-BA) Surface-Mounted Device (SMD) plastic package with visible and solderable side pads.

2. Features and benefits

- High switching speed: $t_{rr} \leq 4$ ns
- Low leakage current
- Reverse voltage $V_R \leq 90$ V
- Low capacitance $C_d \leq 2$ pF
- Ultra small SMD plastic package
- Low package height of 0.5 mm
- Suitable for Automatic Optical Inspection (AOI) of solder joint
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

- High-speed switching
- General-purpose switching
- Reverse polarity protection

4. Quick reference data

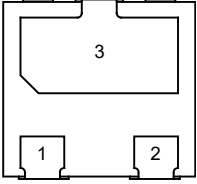
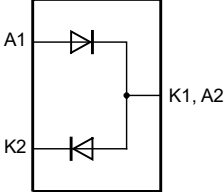
Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per diode							
I_F	forward current	single diode loaded; $T_{amb} = 25$ °C	[1]	-	-	300	mA
V_R	reverse voltage	$T_j = 25$ °C		-	-	90	V
I_R	reverse current	$V_R = 80$ V; $T_j = 25$ °C		-	-	0.5	µA
t_{rr}	reverse recovery time	$I_F = 10$ mA; $I_R = 10$ mA; $I_{R(meas)} = 1$ mA; $R_L = 100$ Ω; $T_{amb} = 25$ °C		-	-	4	ns

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A1	anode (diode 1)	 Transparent top view DFN1110D-3 (SOT8015)	 aaa-022858
2	K2	cathode (diode 2)		
3	K1, A2	cathode (diode 1) and anode (diode 2)		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAV99QB-Q	DFN1110D-3	plastic, leadless extremely thin small outline package with side-wettable flanks (SWF); 3 terminals; 0.65 mm pitch; 1.1 mm x 1 mm x 0.48 mm body	SOT8015

7. Marking

Table 4. Marking codes

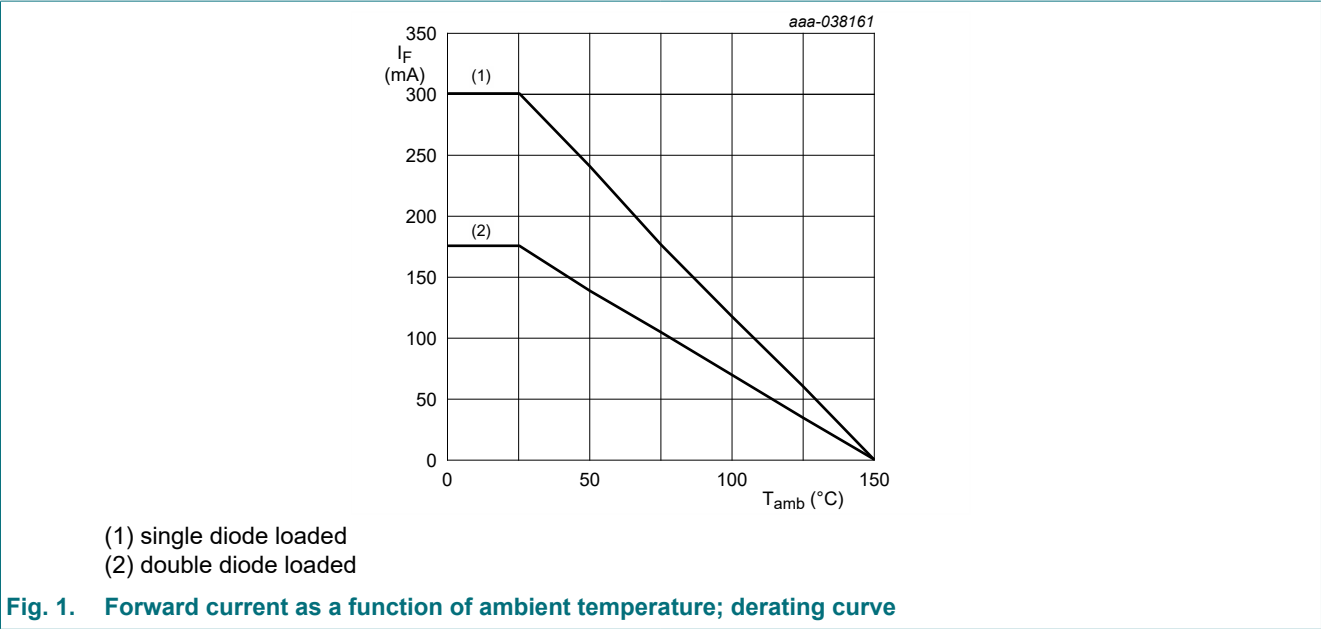
Type number	Marking code
BAV99QB-Q	G6

8. Limiting values

Table 5. Limiting values
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions		Min	Max	Unit
Per diode						
V _R	reverse voltage	T _j = 25 °C		-	90	V
I _F	forward current	single diode loaded; T _{amb} = 25 °C	[1]	-	300	mA
		double diode loaded; T _{amb} = 25 °C	[1]	-	175	mA
I _{FRM}	repetitive peak forward current	t _p ≤ 0.5 ms; δ ≤ 0.25; T _j = 25 °C		-	1000	mA
I _{FSM}	non-repetitive peak forward current	t _p = 100 μs; square wave; T _{j(init)} = 25 °C		-	4.7	A
		t _p = 1 ms; square wave; T _{j(init)} = 25 °C		-	2.4	A
		t _p = 10 ms; square wave; T _{j(init)} = 25 °C		-	1.5	A
Per device; one diode loaded						
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	[1]	-	390	mW
			[2]	-	625	mW
T _j	junction temperature			-	150	°C
T _{amb}	ambient temperature			-55	150	°C
T _{stg}	storage temperature			-65	150	°C

- [1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm².



9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient		[1]	-	-	320	K/W
			[2]	-	-	200	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[3]	-	-	40	K/W

- [1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm².
[3] Soldering point of cathode tab.

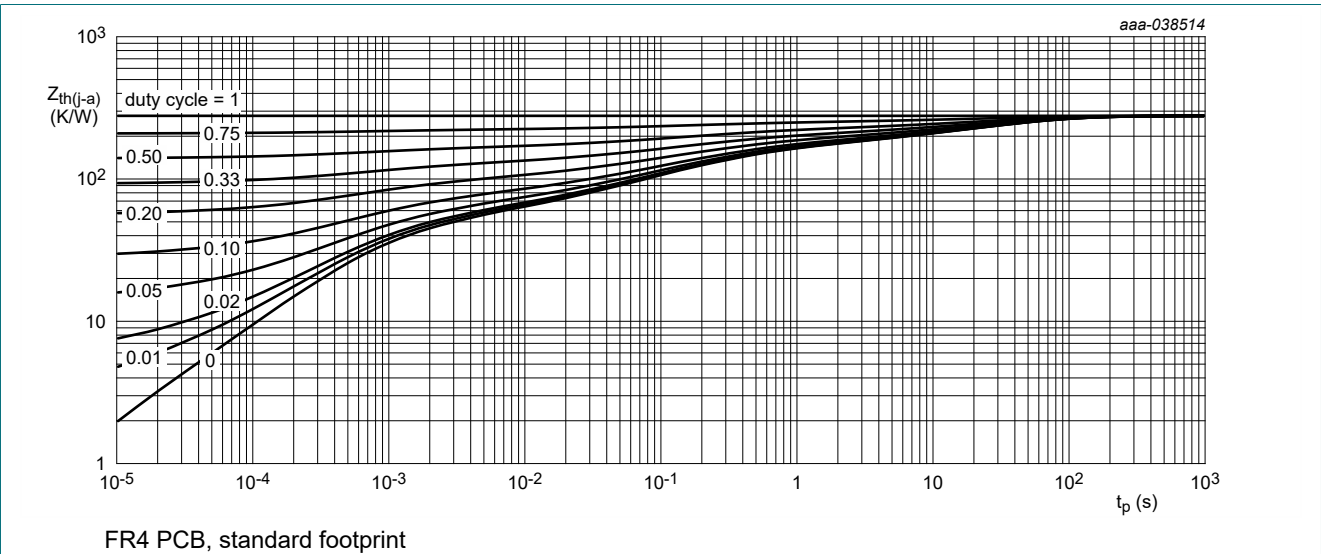


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

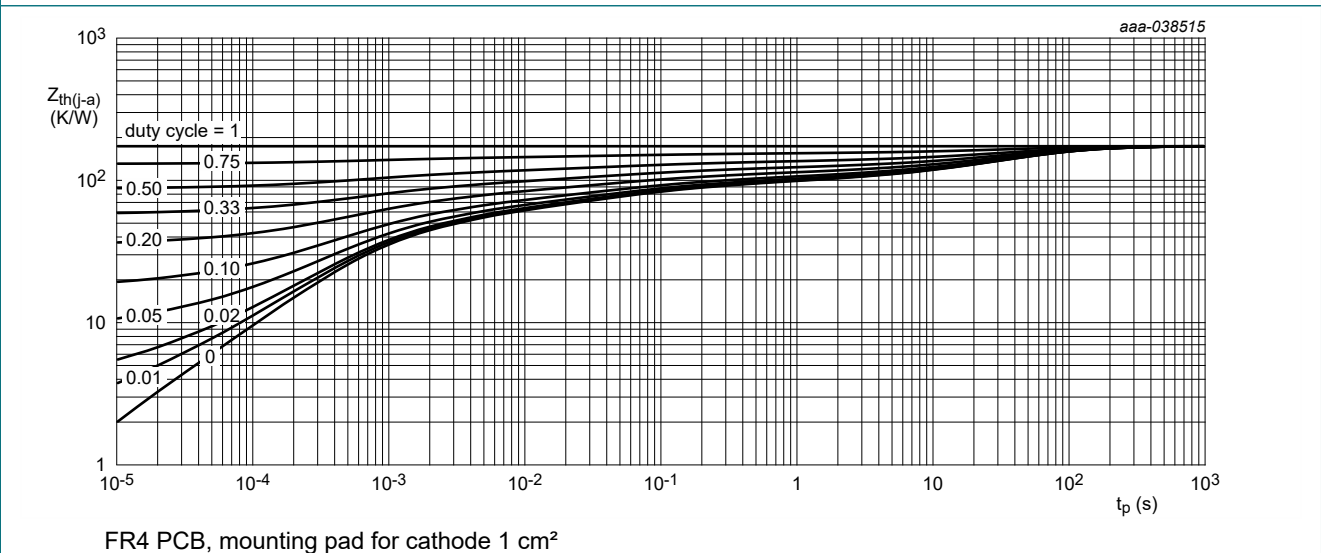


Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per diode						
V_F	forward voltage	$I_F = 1\text{ mA}; T_j = 25\text{ }^{\circ}\text{C}$	-	-	715	mV
		$I_F = 10\text{ mA}; T_j = 25\text{ }^{\circ}\text{C}$	-	-	855	mV
		$I_F = 50\text{ mA}; T_j = 25\text{ }^{\circ}\text{C}$	-	-	1	V
		$I_F = 150\text{ mA}; T_j = 25\text{ }^{\circ}\text{C}$	-	-	1.25	V
I_R	reverse current	$V_R = 25\text{ V}; T_j = 25\text{ }^{\circ}\text{C}$	-	-	30	nA
		$V_R = 80\text{ V}; T_j = 25\text{ }^{\circ}\text{C}$	-	-	0.5	μA
		$V_R = 25\text{ V}; T_j = 150\text{ }^{\circ}\text{C}$	-	-	30	μA
		$V_R = 80\text{ V}; T_j = 150\text{ }^{\circ}\text{C}$	-	-	150	μA
C_d	diode capacitance	$V_R = 0\text{ V}; f = 1\text{ MHz}; T_{\text{amb}} = 25\text{ }^{\circ}\text{C}$	-	-	2	pF
t_{rr}	reverse recovery time	$I_F = 10\text{ mA}; I_R = 10\text{ mA}; I_{R(\text{meas})} = 1\text{ mA}; R_L = 100\text{ }\Omega; T_{\text{amb}} = 25\text{ }^{\circ}\text{C}$	-	-	4	ns
V_{FRM}	peak forward recovery voltage	$I_F = 10\text{ mA}; t_r = 20\text{ ns}; T_{\text{amb}} = 25\text{ }^{\circ}\text{C}$	-	-	1.75	V

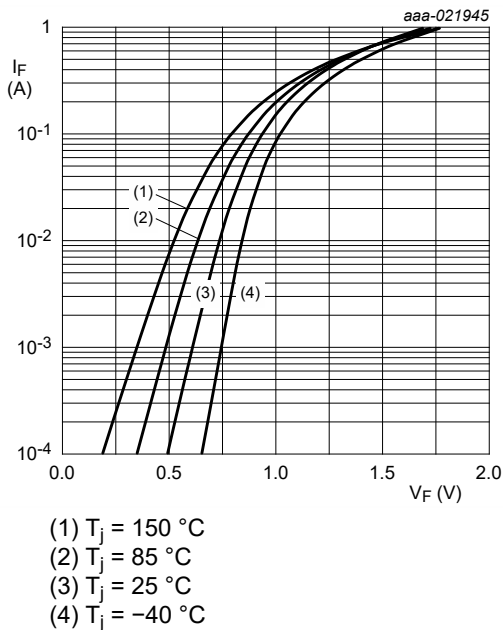


Fig. 4. Forward current as a function of forward voltage; typical values

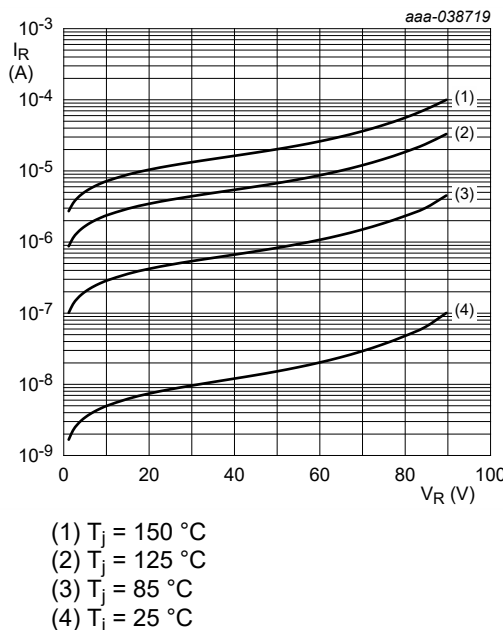
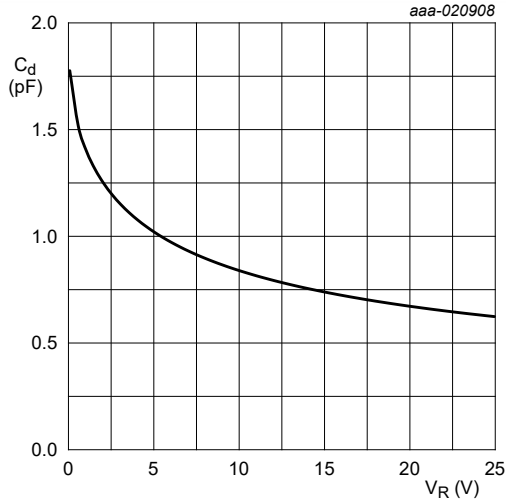
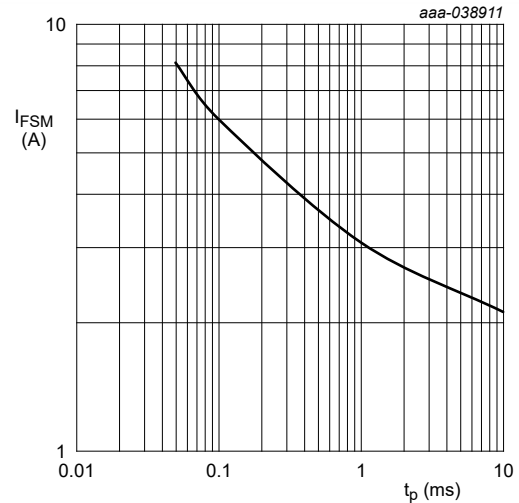


Fig. 5. Reverse current as a function of reverse voltage; typical values



$f = 1\text{ MHz}$; $T_{\text{amb}} = 25\text{ }^{\circ}\text{C}$

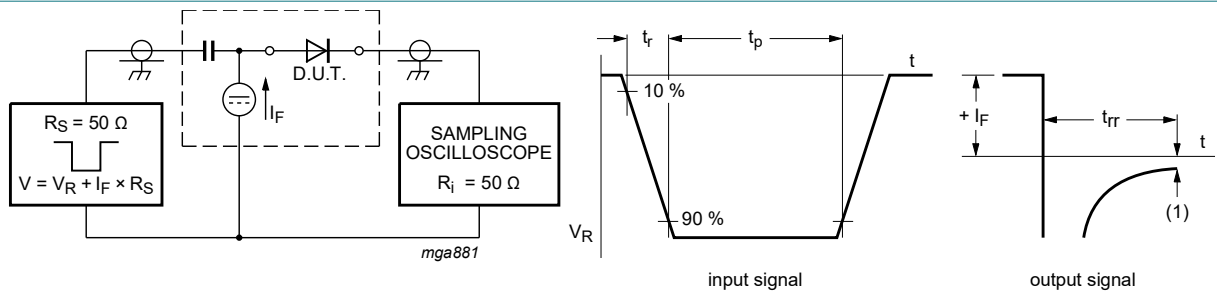
Fig. 6. Diode capacitance as a function of reverse voltage; typical values



Based on square wave currents.
 $T_{\text{amb}} = 25\text{ }^{\circ}\text{C}$

Fig. 7. Non-repetitive forward current as a function of pulse duration; typical values

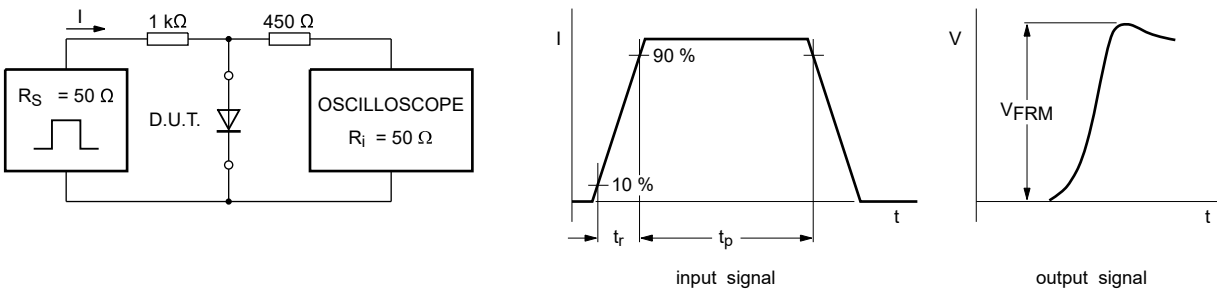
11. Test information



(1) $I_R = 1\text{ mA}$

Input signal: reverse pulse rise time $t_r = 0.6\text{ ns}$; reverse voltage pulse duration $t_p = 100\text{ ns}$; duty cycle $\delta = 0.05$
Oscilloscope: rise time $t_r = 0.35\text{ ns}$

Fig. 8. Reverse recovery time test circuit and waveforms



Input signal: forward pulse rise time $t_r = 20\text{ ns}$; forward current pulse duration $t_p \geq 100\text{ ns}$; duty cycle $\delta \leq 0.005$

Fig. 9. Forward recovery voltage test circuit and waveforms

Quality information

This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard Q101 - Stress test qualification for discrete semiconductors, and is suitable for use in automotive applications.

12. Package outline

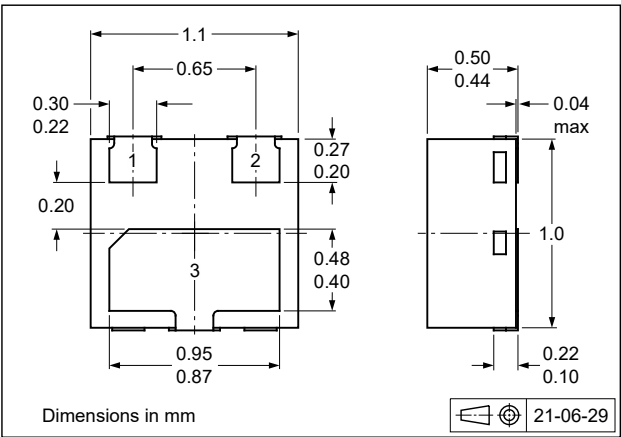


Fig. 10. Package outline DFN1110D-3 (SOT8015)

13. Soldering

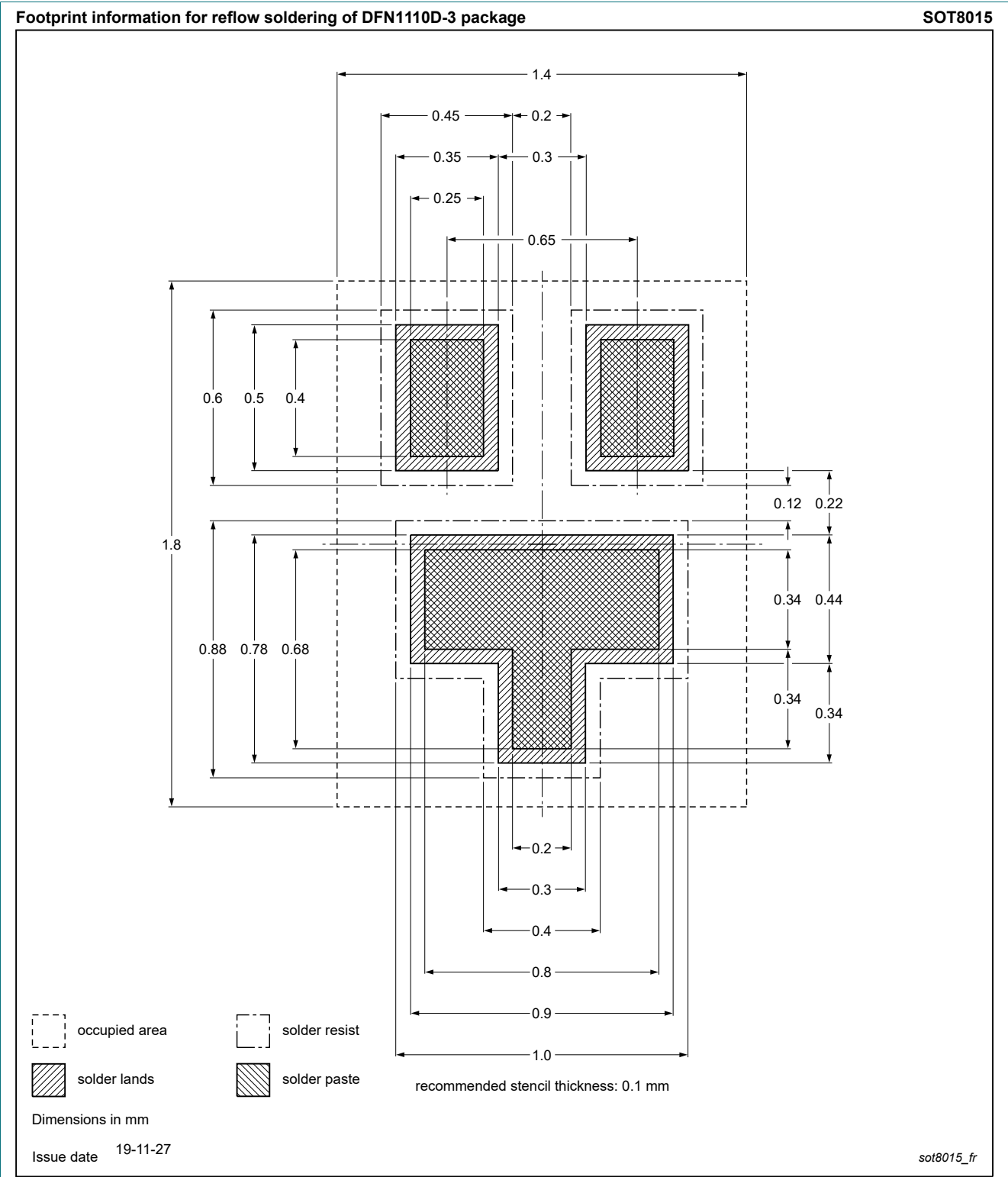


Fig. 11. Reflow soldering footprint for DFN1110D-3 (SOT8015)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAV99QB-Q v.1	20240213	Product data sheet	-	-

15. Legal information

Data sheet status

Document status [1][2]	Product status [3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

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